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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Michel Magne

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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

WEDDLE, ALEXANDER MARION

ART UNIT

PAPER NUMBER

1792

NOTIFICATION DATE

DELIVERY MODE

05/20/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No. 10/510,226	Applicant(s) MAGNE ET AL.	
	Examiner ALEXANDER WEDDLE	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 January 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-19 is/are pending in the application.
- 4a) Of the above claim(s) 16-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-3 and 5-19 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>01/12/2009</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Claims 16-18 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on January 12, 2009.

Applicant's election with traverse of Claims 1-15 and 19 in the reply filed on January 12, 2009 is acknowledged. The traversal is on the ground(s) that the claims of the elected and non-elected inventions are sufficiently related that examination of the entire set of claims creates no serious search burden. This is not found persuasive, because restriction was required between two patentably distinct inventions and examination of the entire set of claims would create a serious search burden.

2. The presence of multiple inventions would not necessarily, in and of itself, cause an undue burden on the examiner because of the excessive time required to perform searches of different inventions. However, the burden on the examiner extends to PATENTABILITY ISSUES associated with, and evolving from, searching multiple different inventions. Issues related to one statutory class are generally very different from those of other statutory classes. That is, issues arising from method claims would potentially be very different from those of article or apparatus claims, and may require complex evidence to resolve critical issues which would be dissimilar and unfamiliar to an examiner in an unrelated art area. Hence, the examination of multiple inventions, in this case directed to [insert inventions groups], represents a serious and undue burden

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on the examiner because of excessive and non-overlapping searches, and the evolution of complex and unfamiliar patentability issues relating to examining multiple and distinct inventions. Restriction is therefore proper under guidelines of MPEP 803. The requirement is still deemed proper and is therefore made FINAL.

Response to Arguments

3. Applicant's arguments filed January 12, 2009 have been fully considered but they are not persuasive. Applicant argues that the claims are patentable over the prior art, because 1) it would not have been obvious to apply a treatment of a homogeneous system of cellulosic material to a heterogeneous system of solid lignocellulose material (Remarks, p. 8, second full paragraph) and 2) that Li teaches away from using reactants with long carbon chains such as described in Vaca-Garcia (Remarks, p. 9, first paragraph).

As to the first argument, Examiner first notes that Claim 1 recites "lignocellulose material" without the limitation "solid." Dependent Claims 15 and 19 recite "piece of wood," which one of ordinary skill in the art may interpret as "solid lignocellulose material." As to applying Li in view of Vaca-Garcia to a heterogeneous system of lignin and cellulose in "lignocellulose material" (recited in Claim 1), both Vaca-Garcia and Li teach applying anhydrides to cellulosic material for treatment, Vaca-Garcia to wood pulp (p. 315, left column, first paragraph) and Li to wood pieces (p. 216, left column, first full paragraph). Apparently, both wood pulp and wood pieces are lignocellulose material. A person of ordinary skill in the art at the time of invention would have recognized the benefit of substituting the mixed anhydride of Vaca-Garcia for the

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anhydrides of Li with a reasonable expectation of conferring beneficial properties to the material containing cellulose along with lignin, including hydrophobicity and good mechanical resistance (p. 318).

As to Claims 15 and 19, Li teaches lignocellulosic material in a solid form. Li teaches that anhydrides react with cell wall components to confer good mechanical properties to the wood (pp. 216-217, Results and discussion). Cellulose is a major structural component of wood. Examiner contends that mixed anhydrides would react the same way with cellulose in solid wood as it would with cellulose derived from wood pulp, and Applicant has not presented evidence to the contrary.

As to the second argument, Li does not teach away from using reactants having long carbonaceous chains of the type described in Vaca-Garcia. Li merely recognizes that without catalysts to boost the reaction rate, there appears to be a correlation between reaction rates and length of the anhydride (p. 218, right column, fourth paragraph – p. 220 first paragraph; p. 221, Conclusions). However, Li also recognizes that catalysts, which increase reaction rates, are known in wood treatment processes (p. 215, right column fourth paragraph). Examiner therefore maintains that the previous rejection relying on the combination of references is proper.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-3, 5-12, and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. "Chemical modification of wood by anhydrides without solvents or catalysts" in view of Vaca-Garcia, C. et al. "Cellulose esterification with fatty acids and acetic anhydride in lithium chloride/N, N-dimethylacetamide medium."

Regarding Claims 1-2 and 5-7, Li et al. teach impregnating lignocellulose material ("wood" with an agent comprising hydrocarbonaceous chains (acetic, propionic, butyric, isobutyric, or hexanoic anhydride) (p. 216, left column, lines 32-40). The modified woods are characterized by weight gain and high resistance to water leaching

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(p. 217, left column, lines 3-24; p. 220, left column, line 15- right column, line 22). The agent is capable of providing covalent grafting of a plurality of hydrocarbonaceous chains to said materials by acetylation, propionylation, etc. (*id.*). Li fail to teach an agent which is a mixed anhydride derived from acetic/ octanoic acids or that the covalent grafting occurs through esterification. Li also fail to teach that the mixed anhydride comprises a first hydrocarbonaceous chain R and a second hydrocarbonaceous chain R₁, where R (or R₁) is represented by a C₂ to C₄ carboxylic acid and R₁ (or R) is represented by a C₆ to C₂₄ fatty acid and where those carboxylic acids and fatty acids are saturated or unsaturated.

Vaca-Garcia et al. teach that the agent which is capable of providing covalent grafting of hydrocarbonaceous chains to the cellulosic portion of lignocellulose may be a mixed anhydride (p. 315, right column, lines 17-20). Examiner takes official notice that lignocellulose is composed of cellulose, hemicellulose, and lignin bound together by hydrogen and covalent bonds. Vaca-Garcia teach an agent comprising mixed anhydrides, particularly of acetic and octanoic acids, which covalently graft a plurality of hydrocarbonaceous chains to the cellulose group of the lignocellulose material through esterification (p. 315, right column, lines 17-20; p. 317, right column, lines 5-25). These mixed anhydrides confer high hydrophobicity and high mechanical resistance to the resulting cellulose ester material (p. 318, left column, lines 7-8; p. 319, left column, lines 9-11).

Vaca-Garcia et al. further teach a mixed anhydride with 1) a chain R, which represents a C₈ fatty acid, and 2) a COCH₃ chain, which represents a C₂ carboxylic acid

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(p. 315, right column, lines 5-16). It is Examiner's opinion that Claims 5 and 6 recite the identical compound with R and R₁ reversed.

It would have been obvious to a person of ordinary skill in the art at the time of invention to substitute the mixed anhydride of acetic acid/ octanoic acid as taught by Vaca-Garcia for the carbonaceous chains as taught by Li, because Vaca-Garcia teach that the mixed anhydride is capable of covalently bonding to the cellulose within lignocellulosic material to confer beneficial properties, including hydrophobicity and good mechanical resistance.

Regarding claim 3, Li further teach treating lignocellulose material between ambient and 150 °C (col. p. 217, left column, lines 3-24).

Regarding claims 8-11, Li disclose that despite their drawbacks, acidic and basic catalysts are widely used for the acetylation/ esterification of lignocellulose materials (i.e., wood treatment) (p. 215, right column, lines 23-29). Additionally, Li suggest that the process of esterification of wood without catalyst is limited because some anhydrides react slowly with wood (p. 221, right column, lines 8-10). Pyridine (a weak base) is one catalyst used in known wood treatments (p. 215, right column, line 28). Moreover, Li teach that strong acid may result in damage to the wood structure (p. 215, right column, lines 25-27).

It would have been obvious to a person of ordinary skill in the art at the time of invention to use a weak base, known in the art to catalyze esterification reactions with lignocellulose, for the purpose of catalyzing an esterification reaction with lignocellulose with a reasonable expectation of success. Further, it would have been obvious to a

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person of ordinary skill in the art at the time of invention to try to use a weak acidic catalyst, because 1) there are a finite number of identified predictable solutions (no catalyst, strong basic catalyst, weak basic catalyst, strong acidic catalyst, weak acidic catalyst, or neutral catalyst) and 2) using a weak acidic catalyst would yield a reasonable expectation of success of increasing the rate of reaction while obviating damage to the wood structure. Likewise, it would have been obvious to a person of ordinary skill in the art at the time of invention to try to use a neutral catalyst, because 1) there are a finite number of identified predictable solutions (no catalyst, strong basic catalyst, weak basic catalyst, strong acidic catalyst, weak acidic catalyst, or neutral catalyst) and 2) using a neutral catalyst would yield a reasonable expectation of success of increasing the rate of reaction while obviating the problems identified in Li.

Regarding Claim 12, Li et al. teach impregnating the anhydrides by immersing (i.e. "dipping") the wood into the anhydrides (p. 216, left column, lines 38-39).

Regarding Claim 14 and 15, Li teach a method of treating wood pieces (30x30x5 mm) at reduced pressure and at higher than ambient temperature (p. 216, left column, lines 12-14, 36-42 and 44-52). Li fail to teach impregnating in an autoclave. It would have been obvious to a person of ordinary skill in the art at the time of invention to use a known device, such as an autoclave, to heat a material at a given pressure in a known process, such as that taught by Li to yield predictable results.

Claims 1-3, 5-12, and 14-15 are therefore *prima facie* obvious absent evidence to the contrary.

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8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. "Chemical modification of wood by anhydrides without solvents or catalysts" in view of Vaca-Garcia, C. et al. "Cellulose esterification with fatty acids and acetic anhydride in lithium chloride/N, N-dimethylacetamide medium" as applied to claim 1 above, and further in view of Mahieu (EP 0190576).

The rejection of Claim 1 over Li et al. in view of Vaca-Garcia et al. as discussed in section 9 is incorporated herein.

Li et al. in view of Vaca-Garcia et al. further teach impregnating lignocellulose material (p. 216, left column, lines 38-39). Li et al. in view of Vaca-Garcia et al. fail to teach impregnating lignocellulose material by spraying. Mahieu ('576) teaches a method for treating building elements made out of wood (i.e., lignocellulose material) by spraying an excess of treatment liquid on the pieces to be treated (Abstract, lines 1-3; Claim 1).

It would have been obvious to a person of ordinary skill in the art at the time of invention to substitute a known technique for impregnating wood by spraying for a known technique of impregnating wood by immersion, or dipping, to yield predictable results.

Claim 13 is therefore *prima facie* obvious absent evidence to the contrary.

9. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. "Chemical modification of wood by anhydrides without solvents or catalysts" in view of Vaca-Garcia, C. et al. "Cellulose esterification with fatty acids and acetic anhydride in lithium chloride/N, N-dimethylacetamide medium" as applied to claim 15 above, and

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further in view of Dawson et al. "Reactivity of radiata pine sapwood towards carboxylic acid anhydrides" (Abstract).

The rejection of Claim 15 over Li et al. in view of Vaca-Garcia et al. as discussed in section 9 is incorporated herein.

Li et al. in view of Vaca-Garcia et al. teach chemically treating wood specimens obtained from hinoki (*Chamaecyparis obtuse*), a variety of cypress, which is from the order of conifers (p. 216, left column, lines 12-14).

Li in view of Vaca-Garcia fail to teach chemically treating pine or fir, (also from the order of conifers). Dawson et al. teach treating pine with carboxylic acid anhydrides to yield good durability towards decay and partial resistance to termite attack (Abstract).

It would have been obvious to a person of ordinary skill in the art at the time of invention to chemically treat pine with the process of Li in view of Vaca-Garcia, because Dawson teaches that pine can be successfully treated with carboxylic acid anhydrides to resist decay and termite attack.

It would have been obvious to a person of ordinary skill in the art at the time of invention to substitute one coniferous wood, hinoki, for another coniferous wood, pine or fir to yield predictable results of a hydrophobic, durable, decay resistant product.

Claim 19 is therefore *prima facie* obvious absent evidence to the contrary.

Conclusion

10. No claim is allowed.

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXANDER WEDDLE whose telephone number is (571) 270-5346. The examiner can normally be reached on Monday-Thursday, 7:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Kornakov can be reached on (571)272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. W./

Examiner, Art Unit 1792

/Michael Kornakov/

Supervisory Patent Examiner, Art Unit 1792